Using immersive 360° videos for science communication on the safety of advanced materials

Robin Wagner[1], Jennifer Müller[1], Birgit Brucker[1], Stefan Schwarzer[2], Peter Gerjets[1]

1 Leibniz-Institut für Wissensmedien, Tübingen, Germany
2 Universität Tübingen, Germany

Today's technologies enable highly immersive experiences, such as with 360° videos. Currently, there are many technical advances in the virtual reality field, so these viewing formats are gaining more and more attention[1]. Particularly immersive 360° videos raise the hope of bringing great benefits, as they can convey authentic experiences and activities[2], e.g., in realistic scientific environments. Therefore, these forms of visualization might help to positively change perceptions and attitudes about the relevance of science[3], making them an exciting tool for science communication, for instance, regarding the safety of advanced materials. However, the effects of immersive technologies are not yet fully understood, and complete immersion seems not always to be the best approach to delivering contents[4]. To address this issue, part of the research project is to investigate the most appropriate degree of immersion for 360° videos as a science communication tool.

A common way of influencing attitudes with immersive interventions involves virtually putting people in the role of another person (Virtual Reality Perspective Taking) so that scenarios are experienced from that person's perspective[5]. However, there is scarce research on the change of different points of view within a 360° video. In this regard, there have been studies using conventional videos: Beege et al. found that a frontal view of a lecturer produced significantly stronger perceived parasocial interactions and better learning outcomes than looking at a lecturer laterally[6,7]. Whether this is also applicable to immersive 360° videos and how different points of view have an impact on variables, such as trust in scientists, remains to be proven and is thus another research aspect of the project.

(1) J. Pirker; A. Dengel. The Potential of 360° Virtual Reality Videos and Real VR for Education—A Literature Review. *IEEE Comput. Graph. Appl.* **2021**, *41* (4), 76–89. https://doi.org/10.1109/MCG.2021.3067999.
(2) Hakulinen, J.; Keskinen, T.; Mäkelä, V.; Saarinen, S.; Turunen, M. Omnidirectional Video in Museums–Authentic, Immersive and Entertaining; Springer, 2017; pp 567–587.
(3) Boda, P. A.; Brown, B. Priming Urban Learners' Attitudes toward the Relevancy of Science: A Mixed-methods Study Testing the Importance of Context. *J. Res. Sci. Teach.* **2020**, *57* (4), 567–596.
(4) Bowman, D. A.; McMahan, R. P. Virtual Reality: How Much Immersion Is Enough? *Computer* **2007**, *40* (7), 36–43.
(5) Nikolaou, A.; Schwabe, A.; Boomgaarden, H. Changing Social Attitudes with Virtual Reality: A Systematic Review and Meta-Analysis. *Ann. Int. Commun. Assoc.* **2022**, *46* (1), 30–61.
(6) Beege, M.; Schneider, S.; Nebel, S.; Rey, G. D. Look into My Eyes! Exploring the Effect of Addressing in Educational Videos. *Learn. Instr.* **2017**, *49*, 113–120. https://doi.org/10.1016/j.learninstruc.2017.01.004.
(7) Beege, M.; Nebel, S.; Schneider, S.; Rey, G. D. Social Entities in Educational Videos: Combining the Effects of Addressing and Professionalism. *Comput. Hum. Behav.* **2019**, *93*, 40–52. https://doi.org/10.1016/j.chb.2018.11.051.